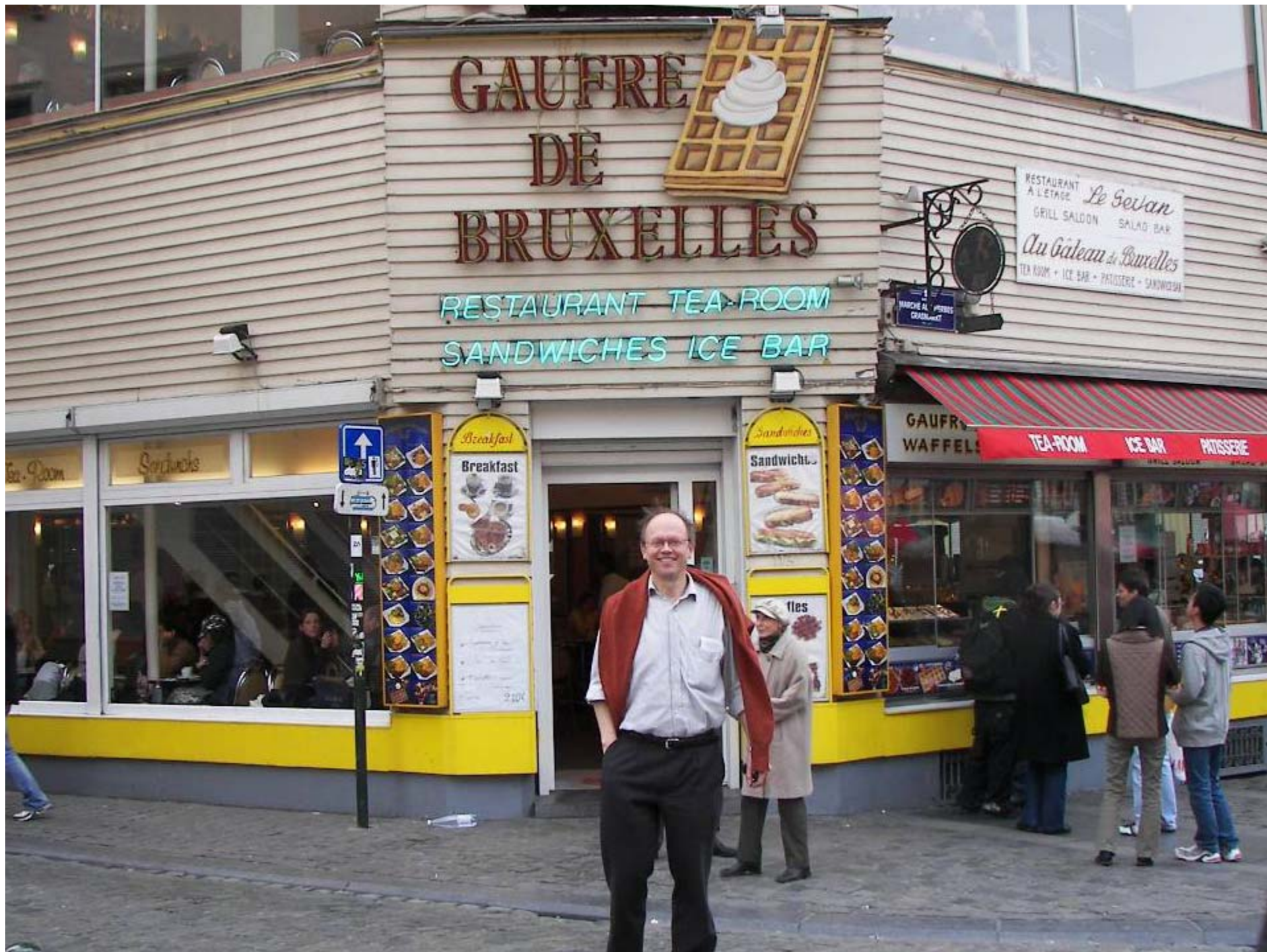
















APR. 2, 2007
10:20

2. English
3. Français
4. Arabiy
5. Russkiy
6. Zhongwen
8. Español



The “PAO”:

APPENDIX 2

OUTLINE FOR THE IPCC WORKING GROUP II CONTRIBUTION TO THE FOURTH ASSESSMENT REPORT CLIMATE CHANGE 2007: IMPACTS, ADAPTATION AND VULNERABILITY Agreed by Plenary XXI, Vienna, 2004

19. Assessing Key Vulnerabilities and the Risk from Climate Change

- Methods and concepts: **issues relating to Article 2 of the UNFCCC**; reasons for concern; measuring damage; identifying key impacts and vulnerabilities, and their risk of occurrence
- Approaches to determining levels of climate change for key impacts
- Assessing key global risks
- Assessing key risks for regions and sectors
- Assessment of **response strategies** to avoid occurrence: **stabilisation scenarios**; **mitigation**/adaptation strategies; avoiding irreversibilities; role of sustainable development; treatment of uncertainty
- Uncertainties, unknowns, priorities for research

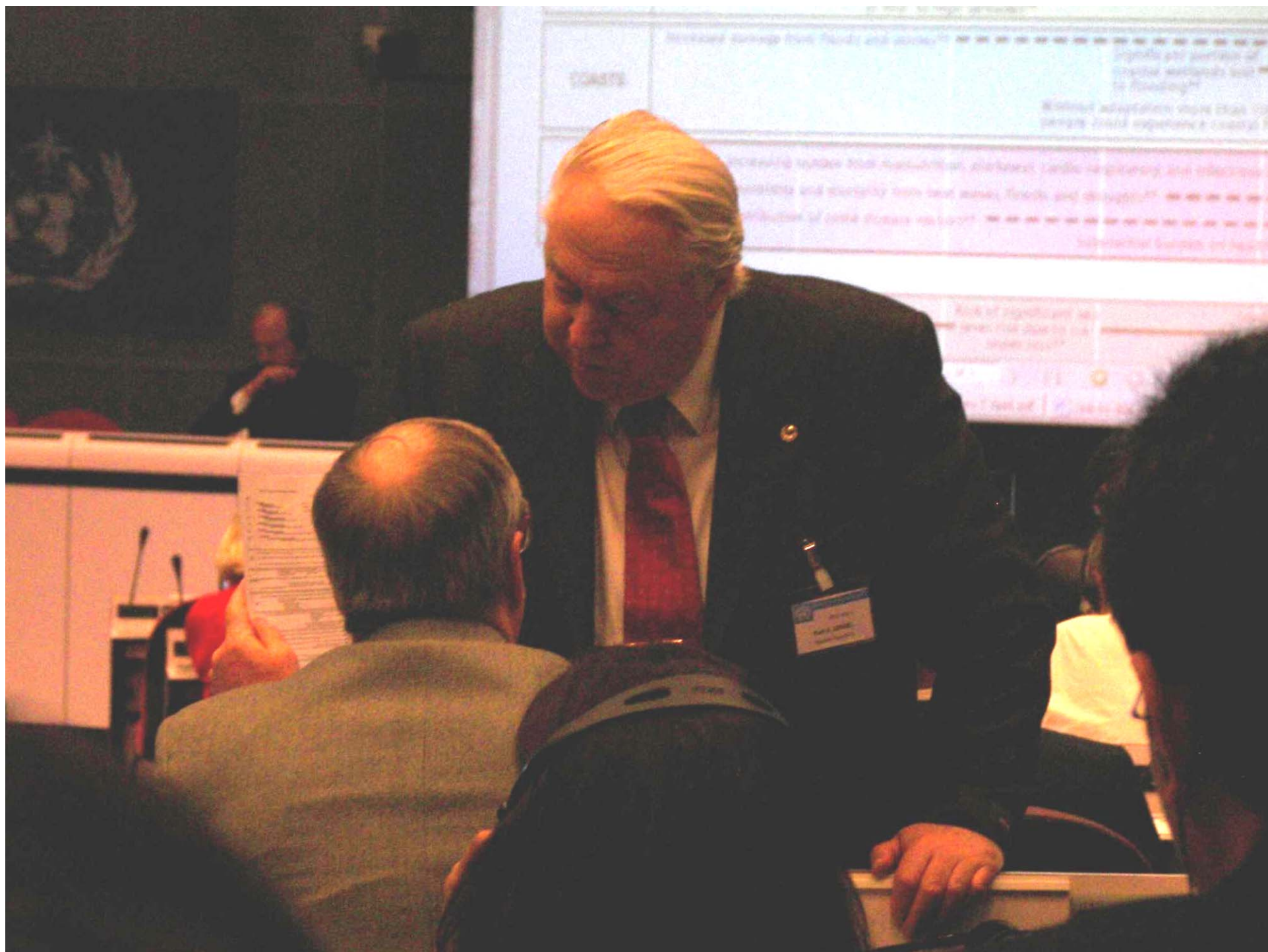
PAO Language in Pre-Plenary SPM

information is available¹⁰. Some of these impacts might be identified as 'key vulnerabilities'. Assessment of potential key vulnerabilities is intended to provide guidance to decision-makers, for example, for identifying levels and rates of climate change that, in the terminology of the UNFCCC Article 2, could result from 'dangerous anthropogenic interference' (DAI) with the climate system. Ultimately, the definition of DAI cannot be based on scientific arguments alone, but involves other judgements informed by the state of scientific knowledge. [19.1, 19.2]

Those managed and human systems where there is some evidence of effects from ~~regional~~ increases in temperature include the following:

- ~~some coastal zones affected by erosion due to sea-level rise [1.3].~~
- effects on agricultural and forestry management at Northern Hemisphere higher latitudes, such as earlier spring planting of crops, and ~~alterations in disturbance regimes of forests due to fires and pests~~ changes in forest fires and pests [1.3].

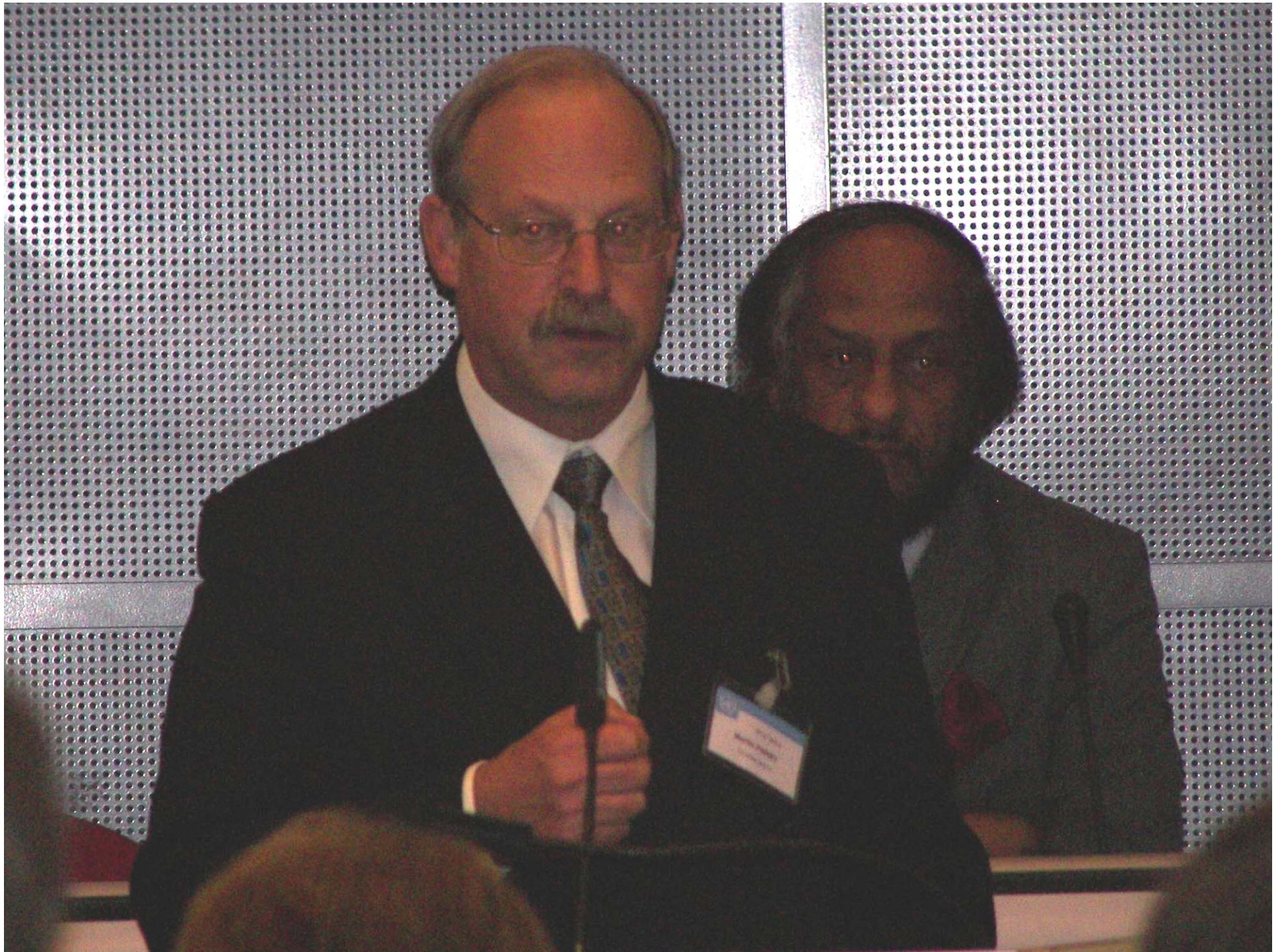




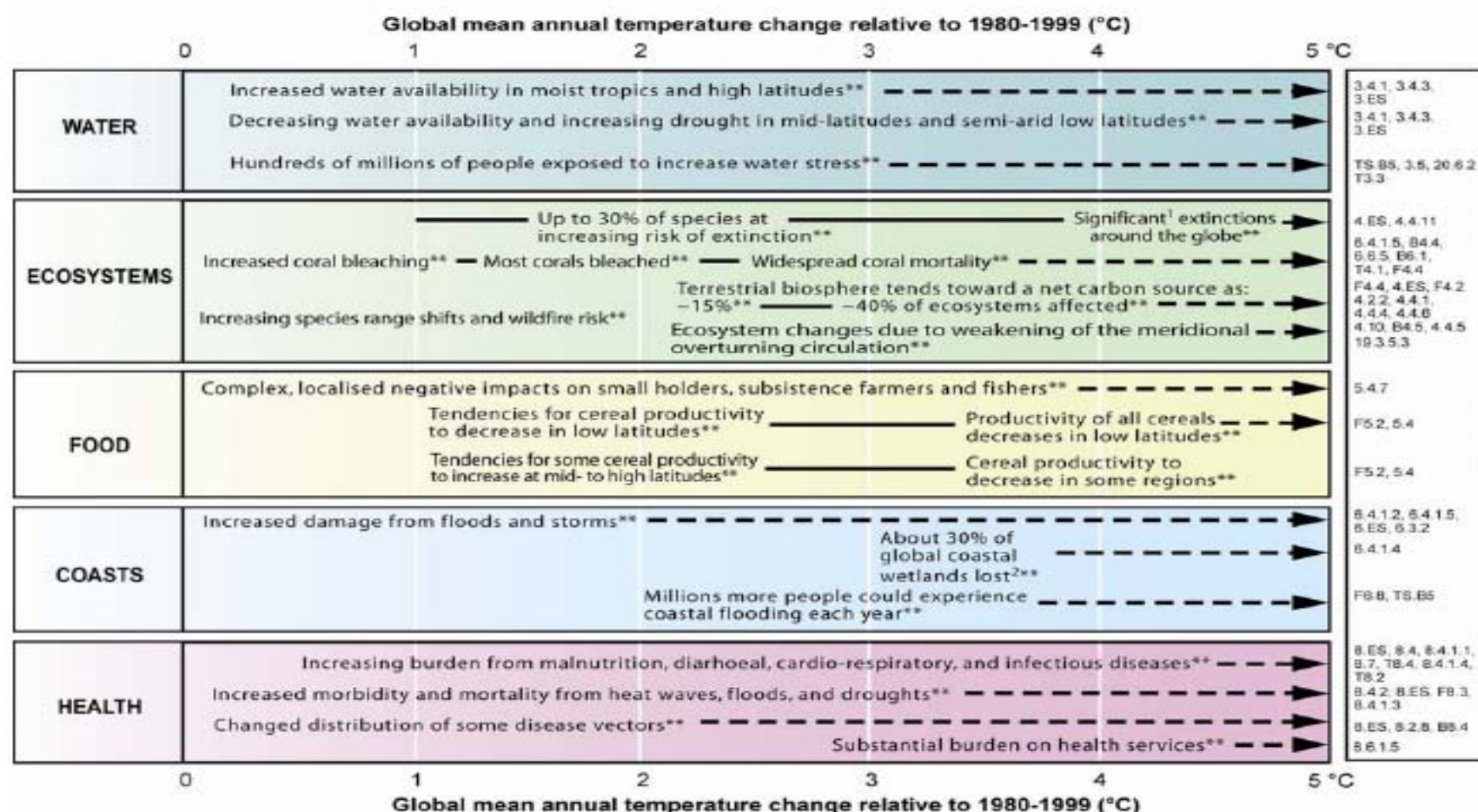








Key Impacts as a Function of Increasing Global Average Temperature Change
(Impacts will vary by extent of adaptation, rate of temperature change, and socio-economic pathway)



¹ Significant is defined here as more than 40%.

² Based on average rate of sea level rise of 4.2 mm/year from 2000 to 2080.

Table SPM-1. Illustrative examples of global impacts projected for climate changes (and sea-level and atmospheric carbon dioxide where relevant) associated with different amounts of increase in global average surface temperature in the 21st century. [T20.7] The black lines link impacts, dotted arrows indicate impacts continuing with increasing temperature. Entries are placed so that the left hand side of text indicates approximate onset of a given impact. Quantitative entries for water scarcity and flooding represent the additional impacts of climate change relative to the conditions projected across the range of SRES scenarios A1FI, A2, B1 and B2 (see Endbox 3). Adaptation to climate change is not included in these estimations. All entries are from published studies recorded in the chapters of the Assessment. Sources are given in the right hand column of the Table. Confidence levels for all statements are high.

Increasing Global Average Temperature Change (Impacts will vary by extent of adaptation, rate of temperature change, and socio-economic pathway)

Global mean annual temperature change relative to 1980-1999 (°C)

5 °C

SRES

B1

B2

A1T

A1B

A2

A1FI

2020s

2050s

2080s

WGI AR4 SPM F3

5.7 °C

0

1

2

3

4

5 °C

WATER

Increased water availability in moist tropics and high latitudes**

Decreasing water availability and increasing drought in mid-latitudes and semi-arid low latitudes**

Hundreds of millions of people exposed to increase water stress**

3.4.1, 3.4.3, 3.ES

3.4.1, 3.4.3, 3.ES

TS.BS, 3.5, 20.6.2, T3.3

ECOSYSTEMS

Up to 30% of species at increasing risk of extinction**

Major extinctions around the globe**

Increased coral bleaching** → Most corals bleached** → Widespread coral mortality**

Terrestrial biosphere tends toward a net carbon source as: ~15%** → ~40% of ecosystems affected**

Increasing species range shifts and wildfire risk**

4.ES, 4.4.11

6.4.1.5, B4.4, 6.6.3, B6.1, T4.1, F4.4

TS.BS, F4.2, 4.1, 4.6, 4.4.5

FOOD

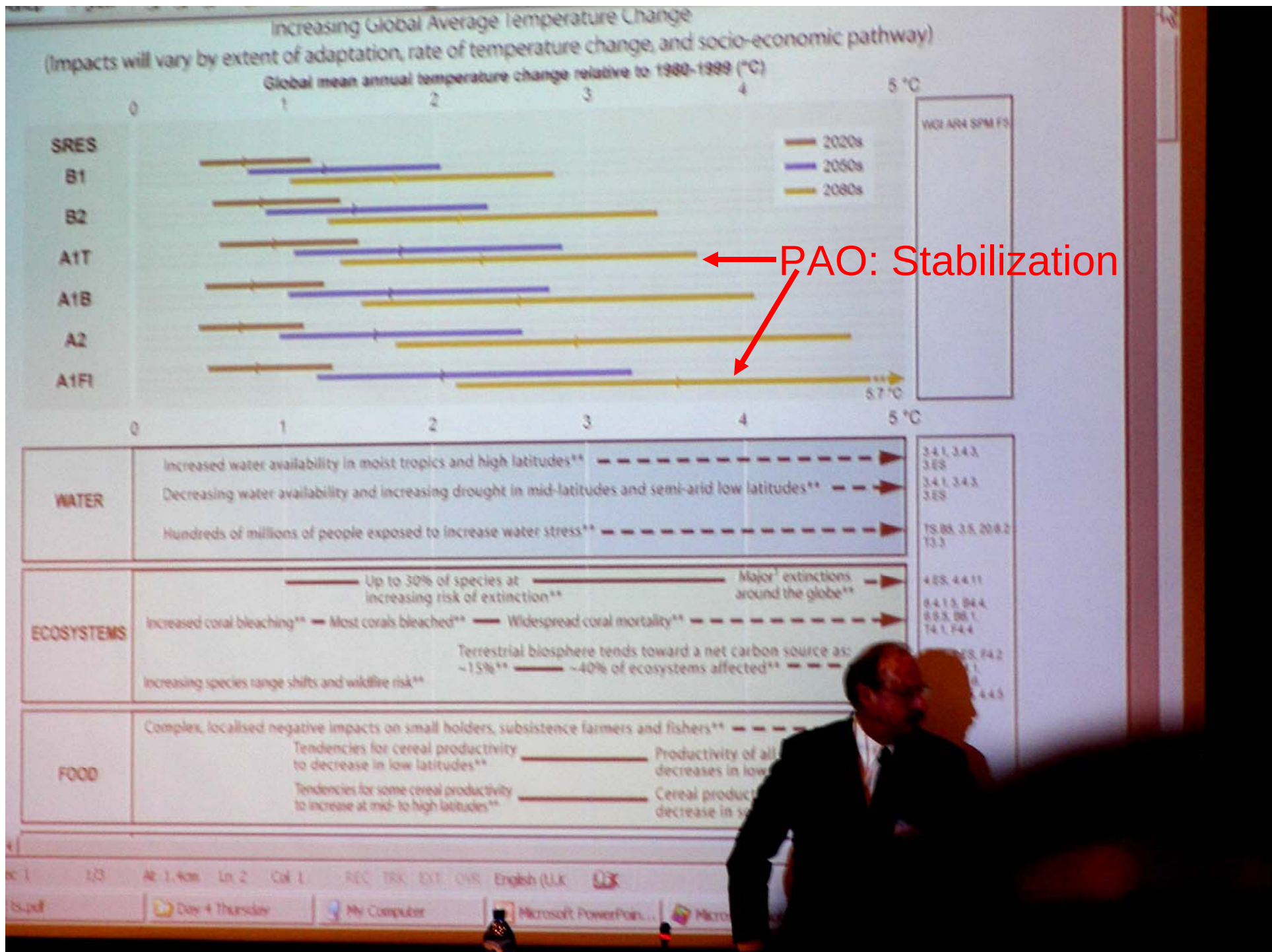
Complex, localised negative impacts on small holders, subsistence farmers and fishers**

Tendencies for cereal productivity to decrease in low latitudes**

Productivity of all decreases in low latitudes**

Tendencies for some cereal productivity to increase at mid- to high latitudes**

Cereal productivity decrease in some high latitudes**



Approved SPM Text

Magnitudes of impact can now be estimated more systematically for a range of possible increases in global average temperature.

Since the IPCC Third Assessment, many additional studies, particularly in regions that previously had been little researched, have enabled a more systematic understanding of how the timing and magnitude of impacts may be affected by changes in climate and sea level associated with differing amounts and rates of change in global average temperature.

Examples of this new information are presented in Table SPM-1. Entries have been selected which are judged to be relevant for people and the environment and for which there is high confidence in the assessment¹³. All entries of impact are drawn from chapters of the Assessment, where more detailed information is available.

Depending on circumstances, some of these impacts could be associated with 'key vulnerabilities', based on a number of criteria in the literature (magnitude, timing, persistence/reversibility, the potential for adaptation, distributional aspects, likelihood and "importance" of the impacts). Assessment of potential key vulnerabilities is intended to provide information on rates and levels of climate change to help decision-makers make appropriate responses to the risks of climate change. [19.ES]

The 'reasons for concern' identified in the Third Assessment remain a viable framework for considering key vulnerabilities. Recent research has updated some of the findings from the Third Assessment. [19.3.7]

Plenary
Approved

Magnitudes of impact can now be estimated more systematically for a range of possible increases in global average temperature.

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Magnitudes of impact can now be estimated more systematically for a range of possible increases in global average temperature [high confidence].

Since the IPCC Third Assessment, many additional studies, particularly in regions that previously had been little researched, have enabled a more systematic understanding of how the timing and magnitude of impacts is likely to be affected by changes in climate and sea level associated with differing amounts and rates of change in global average temperature.

Examples of this new information are presented in Tables SPM-1 and SPM-2. Entries have been selected which are judged to be important for human welfare and for which there is some confidence in the assessment. All entries of impact are drawn from chapters of the Assessment, where more detailed information is available¹⁰. Some of these impacts might be identified as 'key vulnerabilities'. Assessment of potential key vulnerabilities is intended to provide guidance to decision-makers, for example, for identifying levels and rates of climate change that, in the terminology of the UNFCCC Article 2, could result from 'dangerous anthropogenic interference' (DAI) with the climate system. Ultimately, the definition of DAI cannot be based on scientific arguments alone, but involves other judgements informed by the state of scientific knowledge. [19.1, 19.2]

Pre-
Plenary

The “PAO”:

APPENDIX 2

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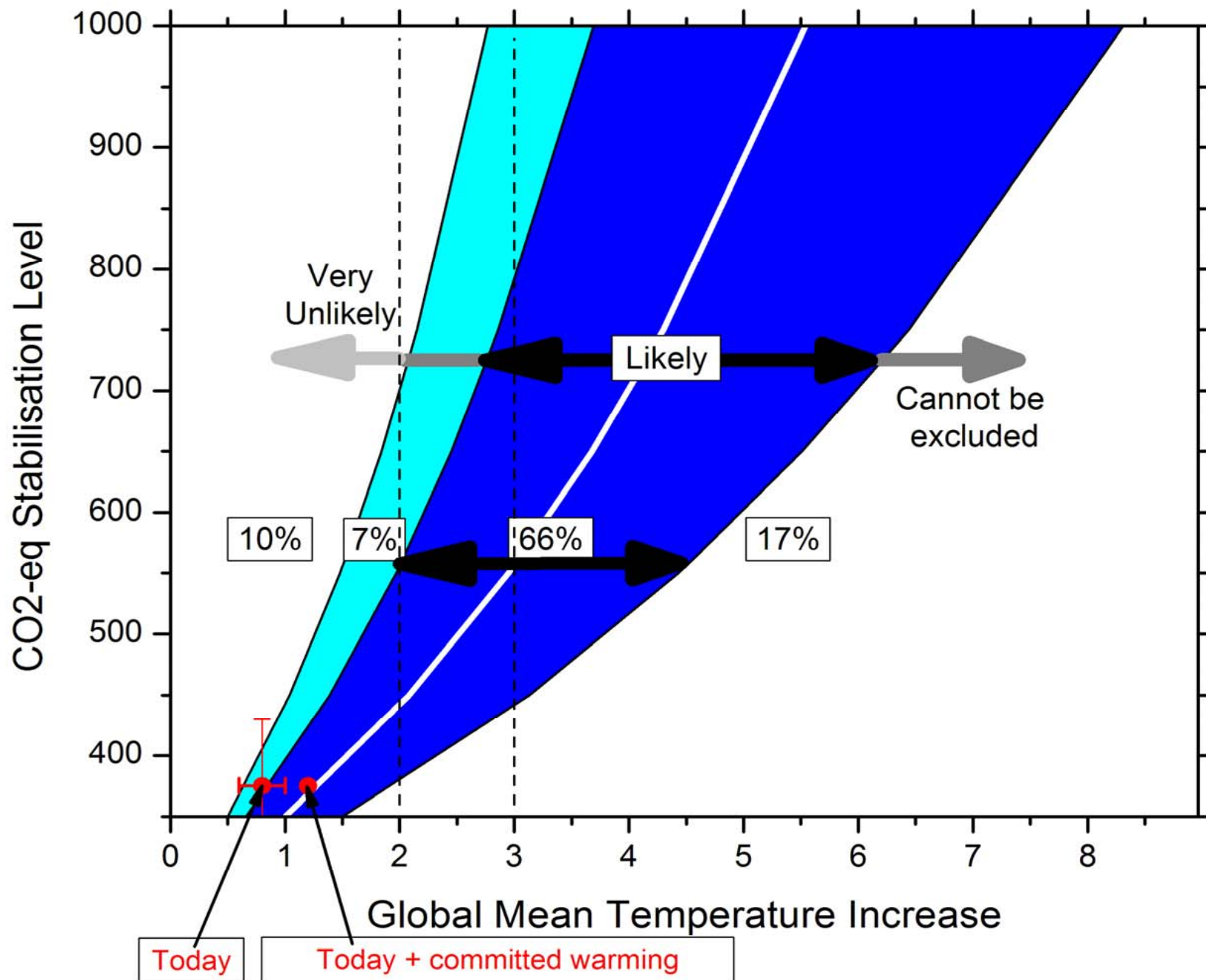
19. Assessing Key Vulnerabilities and the Risk from Climate Change

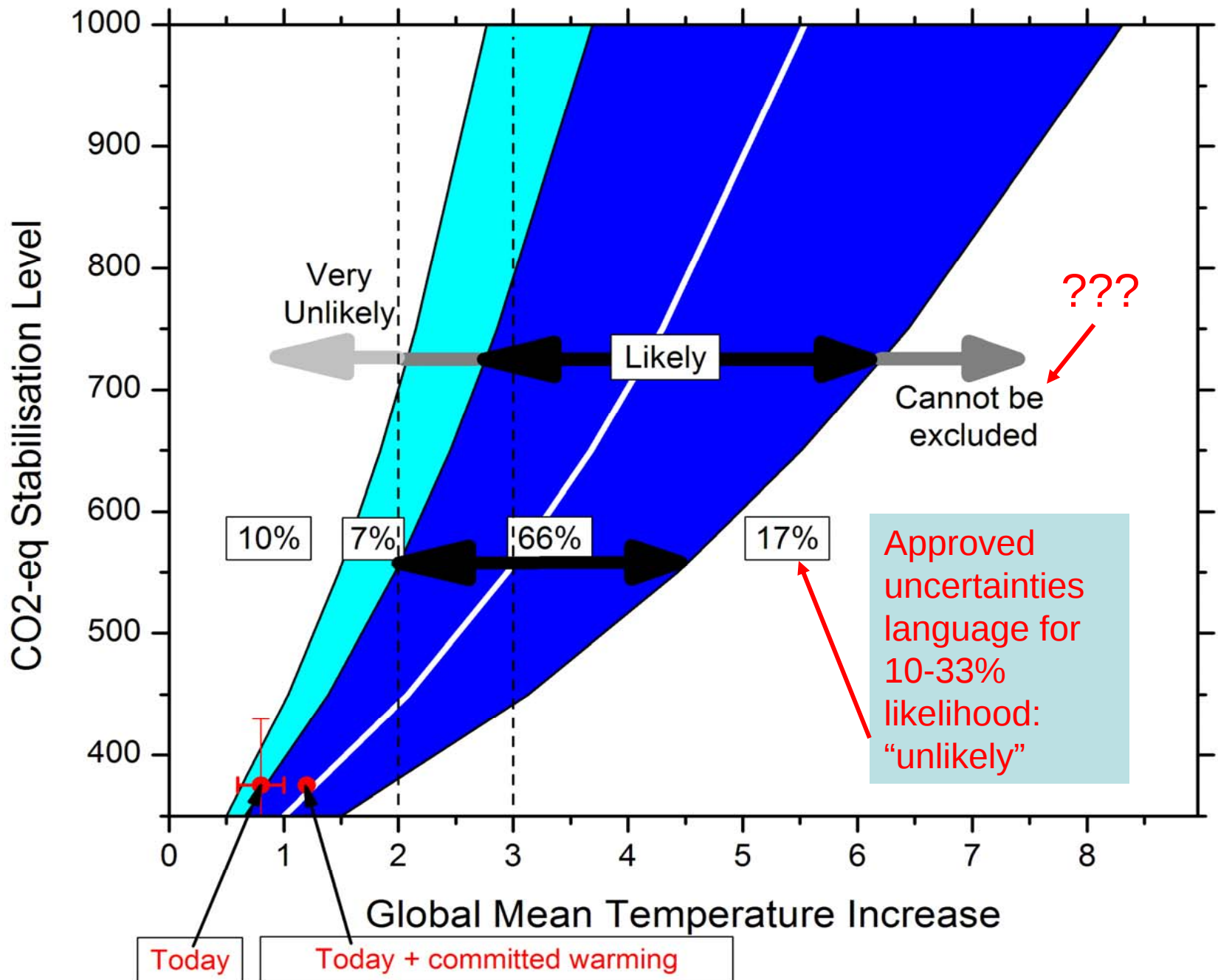
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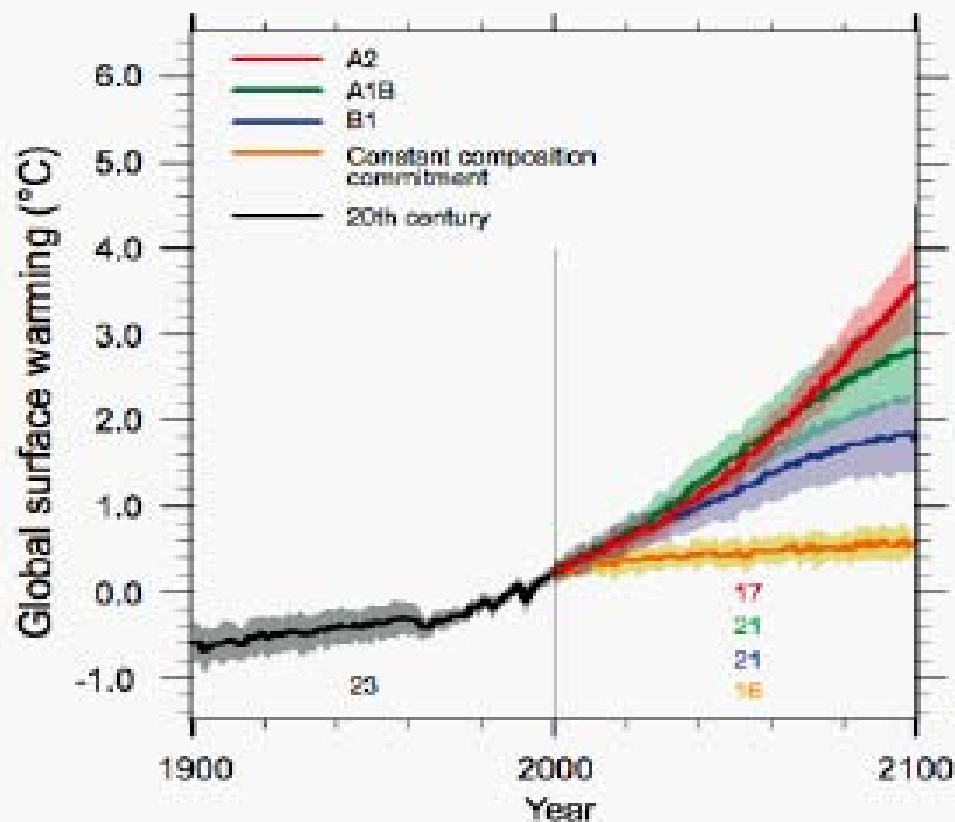
WG 1 Approved AR 4 SPM:

In this Summary for Policymakers, the following terms have been used to indicate the assessed likelihood, using expert judgment, of an outcome or a result:

Virtually certain > 99% probability of occurrence, *Extremely likely* > 95%, *Very likely* > 90%, *Likely* > 66%, *More likely than not* > 50%, *Unlikely* < 33%, *Very unlikely* < 10%, *Extremely unlikely* < 5%.







WG 1:
Pre-Plenary
SPM
Submission

Figure SPM-7. Solid lines are multi-model global averages of surface warming (relative to 1980-99) for the scenarios A2, A1B and B1, shown as continuations of the 20th century simulations. Shading denotes the plus/minus one standard deviation range of individual model annual means. The number of AOGCMs run for a given time period and scenario is indicated by the coloured numbers at the bottom part of the panel. The orange line is for the experiment where concentrations were held constant at year 2000 values. The gray bars at right indicate the best estimate (solid line within each bar) and the likely range assessed for the six SRES marker scenarios. The assessment of the best estimate and likely ranges in the gray bars includes the AOGCMs in the left part of the figure, as well as results from a hierarchy of independent models and observational constraints (Figs. 10.4 and 10.29)

[To be changed:

Change annotation from constant composition to year 2000 constant concentration.

Colour central bar in gray bars and lettering to match A2, A1B, B1 curves as appropriate.

Drop model numbers and move to caption]

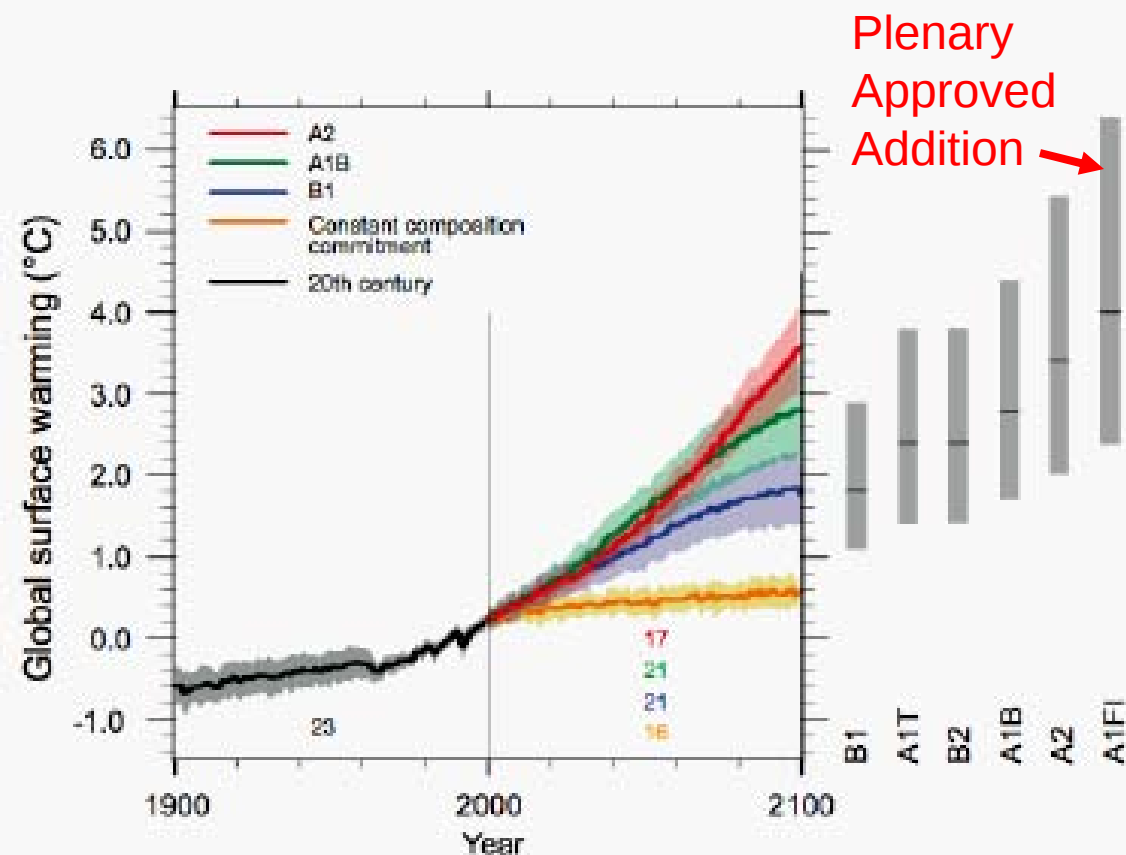


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Table SPM-2. Projected globally averaged surface warming and sea level rise at the end of the 21st century for different model cases. The sea level projections do not include uncertainties in carbon-cycle feedbacks, because a basis in published literature is lacking. {10.5, 10.6, Table 10.7}

	Temperature Change (°C at 2090-2099 relative to 1980-1999) ^a		Sea Level Rise (m at 2090-2099 relative to 1980-1999)	
Case	Best estimate	Likely range	Model-based range excluding future rapid dynamical changes in ice flow	
Constant Year 2000 concentrations ^c	0.6	0.3 – 0.9	NA	
B1 scenario	1.8	1.1 – 2.9	0.18 – 0.38	
A1T scenario	2.4	1.4 – 3.8	0.20 – 0.45	
B2 scenario	2.4	1.4 – 3.8	Pre-	0.20 – 0.43
A1B scenario	2.8	1.7 – 4.4	Plenary	0.21 – 0.48
A2 scenario	3.4	2.0 – 5.4	← proposed	0.23 – 0.51
A1FI scenario	4.0	2.4 – 6.4	0.26 – 0.59	

Notes:

^a These estimates are assessed from a hierarchy of models that encompass a simple climate model, several EMICs, and a large number of AOGCMs.

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B1 scenario	1.8	“Low” → 1.1 – 2.9	0.18 – 0.38
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A2 scenario	3.4	2.0 – 5.4	0.23 – 0.51
A1FI scenario	4.0	2.4 – 6.4 ← “High”	0.26 – 0.59

Notes:

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From the Sports Pages:

Denver is allowing 7.3 points per game. Broncos defensive end Kenard Lang was asked to predict a point total for the Colts offense this Sunday:

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From the Sports Pages: **Type 1 Error Aversion**

Denver is allowing 7.3 points per game.

Broncos defensive end Kenard Lang was asked to predict a point total for the Colts offense this Sunday:

"I'm not predicting nothing. All I'm going to predict is a good game and I'm hoping the Broncos come out on top. **If I make predictions and it goes the opposite way, then I'll look like a horse's fanny.** And I ain't trying to look like a horse's fanny right now."

“Type 1” versus “Type 2” errors and their consequences

Decision	Forecast proves false	Forecast proves true
Accept forecast—policy response follows	Type I error [Squandered resources]	Correct decision

“Type 1” versus “Type 2” errors and their consequences

Decision	Forecast proves false	Forecast proves true
Accept forecast—policy response follows	Type I error [Squandered resources]	Correct decision
Reject or ignore forecast (e.g., “too much” uncertainty)—no policy response	Correct Decision	Type 2 error [Unmitigated damages]

“Type 1” versus “Type 2” errors and their consequences

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Role of Scientists: Assess Risk (= Consequence X Probability of Occurrence) as function of alternative policy choices ; confidence in the assessment of risks; distribution of risks and benefits; traceable account of aggregations.

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Role of Scientists: Assess Risk (= Consequence X Probability of Occurrence) as function of alternative policy choices ; confidence in the assessment of risks; distribution of risks and benefits; traceable account of aggregations.

Role of Decision-makers: Negotiate acceptability of risks and policies that alter risks; make policy choices; guide assessment process.